

REMARKS/ARGUMENTS

Claims 1-7, 9, 11, 13 and 15-17 stand rejected under 35 U.S.C. 102(b) as being anticipated by JP 2001-172511 (JP511). Since claims 13 and 15-17 depend from claim 12, it is assumed that the rejections of independent claim 12 would apply to these claims and they are treated herein accordingly.

Claims 1-7, 9 and 11 have been amended to recite that the hydroxyapatite complex has such a structure that the alkoxysilyl group of the polymer-based material and the hydroxyl group of the hydroxyapatite sintered compact are directly chemically bonded with each other.

On the other hand, JP 511 discloses that a polymer based-material is chemically bonded with calcium phosphate-based particles via a carbamate bond obtained by reacting an active hydroxyl group with an active group such as isocyanate group, diether carbonate, or the like (see paragraph [0037]). Moreover, JP 511 describes that the hydroxyl ion of the calcium phosphate-based particles themselves can be utilized as the hydroxyl group (see paragraph [0043]).

It is apparent, therefore, that JP 511 does not anticipate or disclose the novel method and complex of the present invention wherein the alkoxysilyl group of the polymer based material and the hydroxyl group of the hydroxyapatite sintered compact are directly chemically bonded with each other. Accordingly, claims 1-7, 9 and 11 should be allowable over the teachings of JP 511.

Claims 10 and 12 stand rejected under 35 U.S.C. 102(b) as being anticipated by JP 511 as evidenced by Sato (U.S. 4,276,135). For the reasons set forth hereinafter, it is requested that the Examiner reconsider and withdraw this rejection.

In the inventions of claims 10 and 12, and dependent claims 13-17 the hydroxyapatite complex is formed by bonding the hydroxyapatite sintered compact to the polymer -based

material with the molecular chain represented by the chemical formula (1). More specifically, no modification of the hydroxyapatite sintered compact is performed in the present invention. Thus, the hydroxyapatite complex of the present invention has a structure in which X is the polymer-based material, and Y is the hydroxyapatite sintered compact in the chemical formula (1).

In contrast, JP 511 performs a modification of hydroxyapatite complex by using KBE903, in other words, 3-aminopropyltriethoxysilane. Therefore, the calcium phosphate-polymer complex in JP 511 has a structure in which X is the hydroxyapatite and Y is the polymer-based material. Since the hydroxyapatite complex of in the present invention and the hydroxyapatite complex of JP 511 are completely different in their structures, claims 10 and 12-17 should be allowable over the teachings of JP 511.

The teachings of the secondary Sato reference fail to supply the deficiencies of JP 511 with respect to the novel recitations in claims 10 and 12-17.

Claims 9-12 stand rejected under 35 U.S.C. 102(b) as being anticipated by Hino (U.S. 5,814,681). For the reasons set forth hereinafter, it is submitted that claims 9-12 are not anticipated or rendered obvious by the teachings of Hino.

Claims 9 and 11 recite a hydroxyapatite complex and medical material made of a hydroxyapatite complex, respectively, in which a hydroxyapatite sintered compact and a polymer-based material containing an alkoxysilyl group are chemically bonded, and the hydroxyapatite sintered compact is chemically bonded directly to the alkoxysilyl group.

Claims 10 and 12 recite a hydroxyapatite complex and medical material made of a hydroxyapatite complex, respectively, in which the hydroxyapatite sintered compact is chemically bonded to the polymer-based material with a molecular chain expressed as the formula (1) set forth therein.

An object of the present invention is to use a hydroxyapatite sintered compact without pre-treatment. The present invention utilizes the hydroxyl group on the surface of the hydroxyapatite sintered compact in order to form a chemical bond with the polymer-based material. That is, the polymer-based material is modified, but not the hydroxyapatite sintered compact, in the present invention.

On the contrary, Hino introduces an organic group to the surface of hydroxyapatite powder using an organic silane coupling agent such as γ -methacryloxypropyltrimethoxysilane. That is, a modification of hydroxyapatite powder is performed in Hino.

Thus, the hydroxyapatite complex of the present invention is structurally different from the product obtained by solidifying the composition of Hino. Accordingly, claims 9-12 should be allowable over the teachings of Hino.

Claim 14 stands rejected under 35 U.S.C. 103(a) as being unpatentable over JP 511. Since claim 14 is dependent on claim 13 which is, in turn, dependent on claim 12, it is submitted that claim 14 is allowable over the teachings of JP 511 for the reasons set forth herein with respect to the rejection of claim 12.

Claims 13-17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hino in view of JP 511. Since claims 13-17 depend directly or ultimately from claim 12, it is submitted that these claims are allowable over the teachings of Hino and JP 511 for the reasons set forth herein with respect to the rejection of claim 12.

Claims 1-17 stand rejected under 35 U.S.C. 102(b) as being anticipated by the Furuzono publication (New development trend of intelligent material/technology-chapter 5: Percutaneous device). The Examiner has requested that Applicants clarify the publication date and publisher of Furuzono. There is submitted therewith a cover sheet in Japanese and an English translation

thereof which confirms that the Furuzono publication was published on April 30, 2003 by CMC Publishing Co. Ltd. as part of the Intelligent Materials & Systems Forum, 2003.

Since the priority dates of May 30, 2002 and April 25, 2003 of the present application precede the publication date of April 30, 2003 of the Furuzono publication, it is submitted that this publication is not available as a reference against claims 1-17 in the present application.

New claim 18 has been added to the present application and recites a manufacturing method of a hydroxyapatite complex comprising a hydroxyapatite sintered compact and a polymer-based material, comprising the step of: reacting the hydroxyapatite sintered compact with an isocyanate group of silk fibroin, so as to form a chemical bond.

Other than the Furuzono publication, which is not available as a reference, none of the references cited by the Examiner discloses or suggests the novel manufacturing method of new claim 18. Accordingly, claim 18 should be allowable.


In view of the Examiner's objection to the lined-through references in the original Information Disclosure Statement, dated September 2, 2004, there is submitted herewith a Supplemental Information Disclosure Statement with documents identifying the publication dates of the lined-through references in the original Information Disclosure Statement. Also, the identification of certain lined-through references in the original Information Disclosure Statement has been corrected in the Supplemental Information Disclosure Statement.

FURUZONO et al
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In view of the above amendments and remarks, it is submitted that claims 1-18 in the present application are allowable to Applicants, and formal allowance of these claims is earnestly solicited.

Respectfully submitted,

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